What is claimed is:

1. A voltage probe comprising:

a transmission line having an inner conductor and an outer conductor;

an electrode, spaced apart from the outer conductor; and

a dielectric, disposed between the electrode and the outer conductor, adjacent an inner surface of the outer conductor.

2. A voltage probe as in claim 1, further comprising a lead in electrical communication with the electrode, the lead passing through an opening through each of the dielectric and the outer conductor.

3. A voltage probe as in claim 1, wherein each of the outer conductor and the electrode are curved.

4. A voltage probe as in claim 1, wherein the dielectric is attached to the electrode and the inner surface of the outer conductor.

5. A voltage probe as in claim 1, wherein the electrode overlies the dielectric and the dielectric extends outward beyond the edges of the electrode.

6. A voltage probe as in claim 1, wherein the electrode and the dielectric are each configured as sections of cylindrical surfaces.

7. A voltage probe as in claim 1, further comprising:

a current probe, arranged to monitor a current in the transmission line at a point proximate a plane transverse to the transmission line passing through the center of the electrode.

8. A voltage probe as in claim 1, further comprising a current probe, wherein a current to be measured by the current probe has a characteristic wavelength and the probe is positioned to monitor the current in the transmission line at a point which is within a distance equal to or less than 3% the characteristic wavelength from the plane transverse to the transmission line passing through the center of the electrode.

9. A voltage probe as in claim 1, wherein the electrode has a length small compared to one-fourth of a characteristic wavelength of a signal to be measured.

10. A voltage probe as in claim 1, further comprising:

a second electrode, spaced apart from the first mentioned electrode such that the dielectric is disposed between the first mentioned electrode and the second electrode and adjacent an inner surface of the outer conductor.

11. A voltage probe as in claim 10, wherein each of the outer conductor, the first mentioned electrode and the second electrode are curved.

12. A voltage probe as in claim 10, wherein the first mentioned electrode, the second electrode, and the dielectric are each configured as sections of cylindrical surfaces.

13. A voltage probe as in claim 10, further comprising:

a current probe, arranged to monitor a current in the transmission line at a point proximate a plane transverse to the transmission line passing through the center of the electrode.

14. A method of measuring a signal in a transmission line including an inner conductor and an outer conductor, comprising:

providing a dielectric adjacent the outer conductor;

providing an electrode separated from the outer conductor by the dielectric and positioned adjacent to the dielectric; and

measuring a signal from the electrode indicating a transmission voltage in the transmission line.

15. A method as in claim 14 further comprising:

providing a current probe, configured to measure a current at a point proximate a plane transverse to the transmission line and passing through the electrode; and

measuring a signal from the current probe indicating a transmission current in the transmission line.

16. A method as in claim 15 further comprising;

calculating any one or more of phase, power and impedance information using the measured signal from the electrode and the measured signal from the current probe.

17. A method as in claim 16 wherein the electrode is small compared to one-fourth of a characteristic wavelength of a signal to be measured.

18. A method of controlling a plasma process, comprising:

providing an input radio frequency signal to produce a plasma in a plasma generator, the radio frequency signal traveling in a transmission line having an inner conductor and an outer conductor;

providing a dielectric adjacent the outer conductor;

providing an electrode separated from the outer conductor and adjacent the dielectric;

receiving a signal from the electrode indicating voltage of the radio frequency signal; and

adjusting the input signal in response to the received signal from the electrode.

19. A method as in claim 18 further comprising:

measuring a current of the radio frequency signal; and

adjusting the input signal in response to the measured current.